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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,863	07/28/2003	David Keith Bowen	032516-004	3643
21839	7590	06/23/2004	EXAMINER	
BURNS DOANE SWECKER & MATHIS L L P			HUGHES, JAMES P	
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ALEXANDRIA, VA 22313-1404			PAPER NUMBER	
			2881	

DATE MAILED: 06/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Appli cation No.</b>	<b>Applicant(s)</b>	
	10/627,863	BOWEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	James P. Hughes	2881	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 6-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>020204</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-5, drawn to a multi-foil optic, classified in class 250, subclass 492.1.
  - II. Claims 6-11, drawn to a method and apparatus for high energy radiation lithography, classified in class 250, subclass 492.22.

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination as claimed may employ a focusing device other than the specific apparatus of invention I. The subcombination has separate utility such as focusing energy from a high energy source toward a target other than a lithographic mask; such as: focusing x-rays toward a chemical, biochemical, or inorganic sample.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one

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or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

In a telephone message from James LaBarre on June 7, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-5. Affirmation of this election must be made by applicant in replying to this Office action. Claims 6-11 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### *Drawings*

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Figure 1 is the same as Figure 1 of Peele, A.G. "Instrumentation for a Next Generation X-Ray All-Sky Monitor". Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarfati "Lobster eyes – Brilliant Geometric Design" in view of Petre "Physics of X-ray imaging" and Zola (4,856,043). Sarfati in "Lobster eyes – Brilliant Geometric Design", hereinafter referred to as "Sarfati", teaches well known concepts of a multi-foil optic comprising a plurality of flat plates positioned normal to an arc, each having a reflective surface which provides external refraction to high energy radiation – e.g., x-ray or ultraviolet – incident on the plates form a high energy light source, to collimate and focus the incident high energy radiation on a designated surface. Sarfati teaches that the multi-foil optics may be employed in photolithography processes for manufacturing computer chips. (See e.g., Sections titled "'Lobster-eye' focuses outer space x-rays" and "'Reverse' lobster eye designs fine microchips" and Ref. 5 and 9)

However, Sarfati does not explicitly teach the foils providing total external reflection. It is well known in the art – as shown by Petre "Physics of X-ray imaging", hereinafter referred to as "Petre" – that total external reflection is employed in X-ray imaging. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ total external reflection in the foils of Sarfati, because this would yield an efficient optic device.

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Sarfati in view of Petre does not explicitly teach the thicknesses of the plates. Zola (4,856,043), herein after referred to as "Zola", teaches a device that will collimate and focus high-energy radiation comprising a plurality of plates (or "blades") with a thickness of 50-200 um oriented parallel to each other. Zola teaches that thin plates are advantageous because the thinner the plate, the finer the collimation. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Zola's teaching of thin plates into the device of Sarfati in view of Petre because this would provide for a finer collimation of the radiation beam.

Regarding claim 3, while Sarfati in view of Petre and Zola teaches ultra violet lithography for manufacturing minute computer chips, the use of extreme ultra violet radiation is not explicitly taught. As it is notoriously well known that extreme ultraviolet radiation may be employed in UV lithography, it would be obvious to one of ordinary skill in the art at the time of the invention to employ extreme UV radiation in the device of Sarfati in view of Petre and Zola because this would allow a finer patterning of the resulting manufactured device.

4. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarfati in view of Petre and Zola as applied to claim 1 above, and further in view of McDonald (2002/0021782). Sarfati in view of Petre and Zola teach a multi-foil optic device as described above in section 3. However, they do not explicitly teach that the plates are made from glass. McDonald (2002/0021782), hereinafter referred to as "McDonald", teaches an x-ray optic device wherein x-rays experience total internal reflection while passing through parallel glass plates. (See e.g., paragraph 23 and Fig. 6)

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It would have been obvious to one of ordinary skill in the art at the time of the invention to use glass plates in the invention of Sarfati in view of Petre and Zola because glass is known to be used for collimating and focusing high energy beams, as taught by McDonald, because glass will provide a low cost efficient material.

Regarding claim 5, Sarfati in view of Petre and Zola, in further view of McDonald do not explicitly teach that the plates are made from mica. Since mica is well known to have similar properties as glass, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute mica for glass in the invention of Sarfati in view of Petre and Zola, in further view of McDonald because this would allow an alternate source of manufacturing materials.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schuster et al. (6,226,349) teaches an x-ray focusing device employing a plurality of flat parallel plates (11) having reflective surfaces positioned normal to an arc to provide external reflection to high energy radiation (7) incident on the plates from a high energy radiation source (e.g., 1,4), to focus the incident radiation on a designated surface (8). (See e.g., Col. 7, 65 – Col. 8, 60) Feldman (6,226,120) teaches a high energy focusing device employing a plurality of plates with thicknesses that may be less than 100um. (Col. 4, ll. 30 – Col. 5, ll. 50)

Irving, et al. "Optical meteorology for analysis of lobster-eye optics" teaches principles of lobster-eye optics such as the instant multi-foil device.

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Nova Scientific "X-ray and VUV Optics" publication teaches the basic knowledge of x-ray lithography employing a multi-foil optic device. Three articles from 1996 are also cited.

Manners, James "Lobster eye telescopes" reviews the teachings of Schmidt (1975) and Angel (1979) teaching a multi-foil optic device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 571-272-2474. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 571-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James P. Hughes  
Patent Examiner  
Art Unit 2881

JH

*Nikita Wells*  
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PRIMARY EXAMINER 06/24/09